Abstract 2

Effect of Stress State on Flow and Fracture of Bulk Metallic Glass

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Tension and compression tests have been performed with high alignment fixtures on two different zirconium-based bulk metallic glass specimens at atmospheric pressure as well as with levels of superimposed hydrostatic pressure up to 700 MPa. The results show essentially no difference in applied flow stress or fracture stress between compression and tension specimens over the range of pressures tested. However, a difference in fracture plane angle between compression and tension specimens was observed, suggesting a normal stress effect, as in granular solids, on the flow and fracture behavior of the bulk metallic glass specimens. The data is compared to various flow and fracture theories over a very wide range of normal stresses. Over the range tested, a Mohr-Coulomb flow theory appears to best describe the data. Work supported by DARPA SAM Program through ARO- DAAD19-01-0525 with supply of materials by W.L. Johnson and T. Hufnagel.